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CLAIMS

1. A hydraulic tensioner for a studbolt or similar, fitted with a nut, extending from an article of machine, said tensioner including or comprising:
- 5 a puller bar for engagement in an internal thread in an end of the studbolt;
- a bridge extending around and/or over the nut, engageable with the article or machine; and
- hydraulic means between the puller bar and bridge and
- 10 operable to cause the puller bar to tension the studbolt by pulling the one end of the studbolt in a direction away from the article or machine.
2. A hydraulic tensioner as claimed in Claim 1, and further including:
- a puller buddy engageable with an external thread about the
- 15 one end of the studbolt and engageable with the puller bar.
3. A hydraulic tensioner as claimed in Claim 1 or Claim 2 wherein:
- the internal thread in the studbolt is stepped in diameter and the puller bar has a threaded end with complementary stepped external
- 20 threads.
4. A hydraulic tensioner as claimed in Claim 1 or Claim 2 wherein:
- the internal thread in the studbolt is substantially conical or tapered; and
- 25 the puller bar has a thread end with a complementary substantially conical or tapered external thread.
5. A hydraulic tensioner as claimed in Claim 4 wherein:
- the internal thread on the studbolt and the external thread on the end of the puller bar are of tapered buttress threads.
- 30 6. A hydraulic tensioner as claimed in Claim 5 wherein:
- the shoulders of the buttress threads are at an angle of approximately 10° (to the normal to the horizontal axes of the studbolt and

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puller bar).

7. A hydraulic tensioner as claimed in Claim 6 wherein:
the pitch of the external thread on the puller bar is greater
than the pitch of the internal thread in the studbolt.

5 8. A hydraulic tensioner as claimed in Claim 7 wherein:
the pitch of the external thread on the puller bar is 100.1%
to 100.5% of the pitch of the mating thread in the studbolt.

9. A coupling for the hydraulic tensioner of the type as claimed
in Claims 1, 2 or 4 wherein:
10 the internal thread on the studbolt and the external thread
on the end of the puller bar are of tapered buttress threads.

10. A coupling as claimed in Claim 9 wherein:
the shoulders of the buttress threads are at an angle of
approximately 10° (to the normal to the common axes of the studbolt and
15 puller bar).

11. A coupling as claimed in Claim 10 wherein:
the pitch of the external thread on the puller bar is greater
than the pitch of the internal thread in the studbolt.

12. A coupling as claimed in Claim 11 wherein:
20 the pitch of the external thread on the puller bar is 100.1%
to 100.5% of the pitch of the mating thread in the studbolt.

13. A nut assembly for use with the hydraulic tensioner, as
claimed in any one of Claims 1 to 8, the nut assembly having including or
comprising:

25 a nut body with a substantially conical or tapered peripheral
surface;

an annular collar or shell with a complementary conical or
tapered recess to receive the nut body, in use; and

30 the nut body being screwed, in use, on the studbolt into the
recess of the annular collar or shell.

14. A nut assembly as claimed in Claim 13 and further
including:

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a base washer having a substantially part-spherical face engageable by a complementary part-spherical face on the annular collar or shell to enable the base washer and annular collar or shell to be self-aligning.

5 15. A washer for use with the tensioner as claimed in any one of Claims 1 to 8 and/or the nut assembly as claimed in Claims 13 or 14, said washer having including or comprising:

a first and second annular means mating at a slip plane angled from the plane transverse to the axis of the washer, and

10 removable or releasable means holding the first and second annular means against relative slip over the slip plane therebetween whilst the removable or releasable means is in place.

16. An hydraulic tensioner for application with a stud bolt fitted with a nut, said tensioner having including or comprising:

15 a puller bar for engagement in an internal thread with the studbolt;

a puller buddy for engagement with an external thread on the studbolt and with the puller bar;

20 an hydraulic means acting via a bridge around and/or over a nut and against the puller bar to tension the studbolt.

17. A nut for use with the hydraulic tensioner claimed in Claim 16, the nut having including or comprising:

a nut body with a substantially conical or tapered peripheral surface;

25 an annular shell with a complementary conical or tapered recess to receive the nut body, in use;

the nut body being screwed, in use, on a studbolt into the recess of the annular shell.

18. A washer for use with the tensioner as claimed in Claim 16 and/or conical nut as claimed in Claim 17, the washer having including or comprising:

30 first and second annular means mating at a slip plane

angled from the plane transverse to the axis of the washer, and
removable or releasable means holding the first and second
annular means against relative slip over the slip plane therebetween
whilst the removable or releasable means is in place.